REMARKS

This application has been reviewed in light of the Office Action mailed May 6, 2004. Reconsideration is respectfully requested in light of the following remarks.

Claims 1-4, 9/3, 10, 20, 22 and 24 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Takeda. Reconsideration is respectfully requested for the following reasons.

Claim 1 recites a "diffracting device configured to transmit the light beam emitted from the light source, and to diffract a light beam reflected from the optical recording medium." Claim 1 further recites "an optical device having a reflecting portion and a transmitting portion, configured to reflect one part of the light beam emitted from the light source to the diffracting device by the reflecting portion and to transmit another part of the light beam emitted from the light source to the optical recording medium by the transmitting portion, and to transmit the light beam reflected from the optical recording medium to the diffracting device by the transmitting portion."

Takeda fails to teach or suggest these claim limitations, and the structure of the claimed invention offers advantages over the structure of Takeda. The present invention uses a transmissive hologram for obtaining both the signals from the optical medium and the monitor signals. As discussed in the specification, for example,

> by using only a transmitting type diffracting device of a transmitting type hologram, a signal light from the optical recording medium 10 and a monitor light are both guided to the one photodetecting device 7. As a result, the light utilization efficiency and the accuracy of monitor light detection can be improved and further the accuracy of signal light detection can be improved.

Specification, page 9, lines 39-45.

The transmissive hologram obtains signals of a disk through a process of diffracting the light reflected by the disk. In the present invention, as shown in Figure A

below, the monitor signals are produced by transmissively diffracting the light in the transmissive hologram, after leading the reflection light from the reflection layer to the transmissive hologram. The hologram for the monitor signals exists on a surface different from the reflection layer, and not on the reflection layer, as shown in Figure B below.

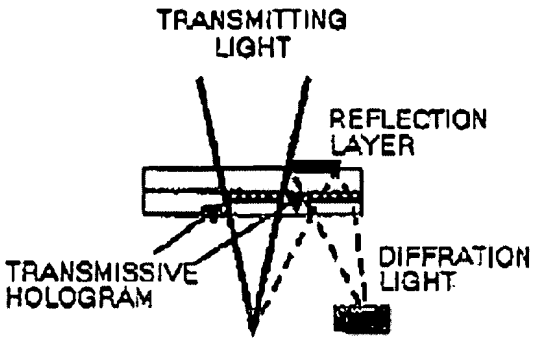

FIG. A

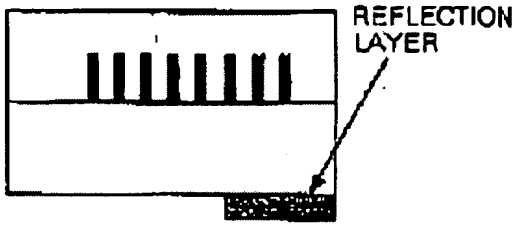

FIG. B

The optical pickup apparatus according to the present invention first reflects with a reflection surface light which is not captured by a lens, causes the reflected light to be directed through a transmission diffraction element, and leads the diffracted light to a photoreceptor so as to monitor the light. Such an optical pickup apparatus offers several advantages, some of which are as follows. No substantial reduction of light efficiency can be expected. The apparatus can be miniaturized to a sufficient extent since a photoreceptor for signal detection and a photoreceptor for monitoring detection are packed in a single chip. Also, by using a polarization hologram as the transmission diffraction element, a diffraction efficiency is improved so that an amount of light led to the photoreceptor is increased. Moreover, a signal detection hologram and a monitoring detection hologram are both transmission-type, and can therefore be formed in a common shape on a single substrate, which is suitable for mass production.

Takeda, on the other hand, obtains its monitor signal by reflection-diffracting light from a light source using a reflection hologram, rather than by a transmissive hologram. This is shown in Figure 3B of Takeda. As shown in figure 3C of Takeda, the hologram is formed on the surface of the reflection layer. Annotated versions of Figures

3B and 3C of Takeda are reproduced below. With Takeda, the holograms for obtaining disk signals and monitor signals have grooves with depths equal to each other. As a result, the respective transmissive and reflection holograms are not optimally provided with the grooves of different depths, and the holograms cannot produce optimal light amounts.

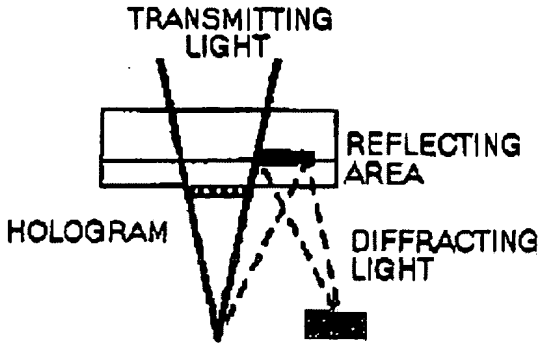

FIG. 3B

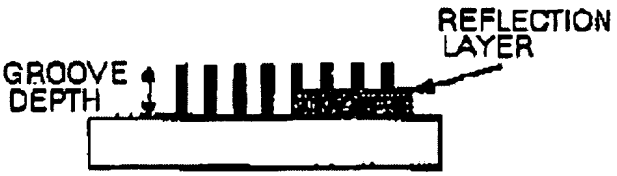

FIG. 3C

During a telephonic interview with the Examiner conducted on June 29, 2004, the Examiner asserted that Takeda teaches a "transmissive hologram" in Figure 3C. Applicants respectfully disagree for the following reasons. The grating 331 and 341 as shown in Figure 3C of Takeda is a reflection hologram rather than a transmissive hologram. The difference between a transmissive hologram and a reflection hologram is as follows. In a reflection hologram, the hologram is immediately adjacent to the reflection film. In the transmission hologram, there is a transmission substrate between the hologram and the reflection film – that is, the hologram is not immediately adjacent to the reflection film.

Thus, Takeda fails to teach or suggest the above-quoted limitations of claim 1. For at least these reasons, claim 1 is allowable. Claims 2-4, 9/3, 20 and 22 depend from claim 1 and contain every limitation of claim 1. Claims 2-4, 9/3, 20 and 22 should be allowed for at least the reasons for allowance of their base claim, and because these

dependent claims contain additional limitations which render the claims allowable over Takeda.

For example, dependent claim 4 recites an optical pickup apparatus "wherein the diffracting device is a polarization hologram ..., and includes a polarization hologram portion configured to diffract the light beam reflected from the optical device to the photodetecting device for monitor light detection." The Office Action asserts that Takeda teaches a "polarization hologram configured to diffract the light beam ... to the photodetecting device for monitor light detection. (Col. 7, lines 40-60)." Office Action, p. 3. To the contrary, the cited portions of Takeda teach that when "an optical polarizing property may be given to the hologram lens[,] ... the second diffraction area ... cannot efficiently reflect and defract the laser light Lo toward the optical detector for monitoring ... ." Col. 7, ll. 40-49 (emphasis added). Takeda then teaches forming a "second diffraction area 34 having a bright-dark type diffraction grating" to perform the monitoring function. Col. 7, ll. 51-58. Thus, Takeda does not teach or suggest the limitations of claim 4, and this is another reason why claim 4 is allowable.

Moreover, the hologram of claim 4 varies diffraction efficiency in accordance with a polarization direction. As illustrated below in Figures 1 and 2 below, the light efficiency with respect to the monitoring light is extended to approximately 38% in the case of the polarization hologram, in which transmission is 95% and diffraction is 40%, with the reflection surface on the top and the 1/4 wave-length plate underneath.

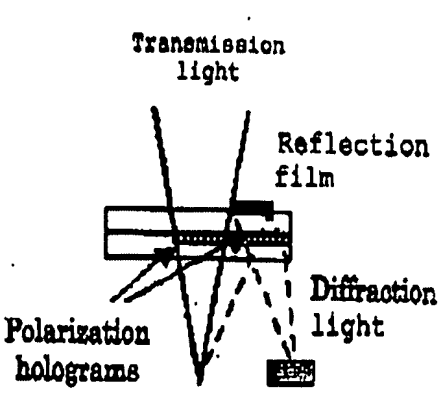

FIG. 1

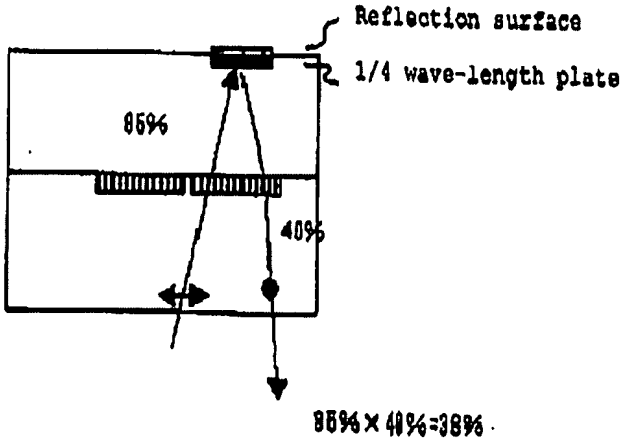

FIG. 2

In Takeda, the second diffraction area 34 serving as a diffraction area for the monitoring light includes the reflecting portion 342 and the non-reflecting portion 343, as illustrated in Figure 5 of Takeda. The non-reflection portion has a relatively small efficiency of reflection diffraction as it transmits light. Therefore, has a drawback in that the light efficiency is reduced, relative to the optical pickup apparatus of the present invention.

Also, where the first diffraction area 33 and the second diffraction area 34 are provided on the same surface, as illustrated in Figure 3C of Takeda, these two areas are processed at the same time and therefore have diffraction efficiencies substantially equal to each other. The first diffraction area is generally designed to have a higher transmissivity (e.g., approximately 80%) and a lower diffraction efficiency (e.g., approximately 8%) in order to cause light from a light source to enter the disc as much as possible. Therefore, the second diffraction area 34 of Takeda for monitoring light also reduces diffraction efficiency and thus has a drawback in that the light efficiency is inferior relative to the optical pickup apparatus of the present invention.

Dependent claim 9/3 recites that "a section of the diffracting device at a side of the optical device forms a section of bilateral asymmetry." In the present invention, the diffraction portion has an asymmetrical cross section, as shown in Figure 3 below. The diffraction portion of Takeda, to the contrary, has only a symmetrical cross section, as illustrated in Figure 4 below. With the diffraction portion having a symmetrical cross section, the light reflected by the reflection film is divided into a plurality of light such as a zero order light, a positive primary order light, a negative primary order light, and so on, and, as a result, the amount of the positive primary light used for the monitoring detection is reduced.

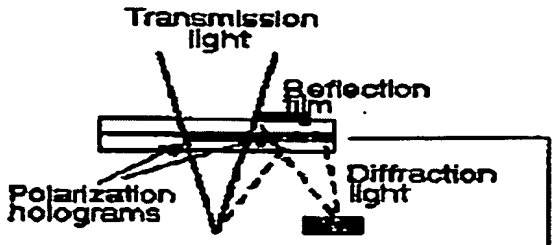

FIG. 1

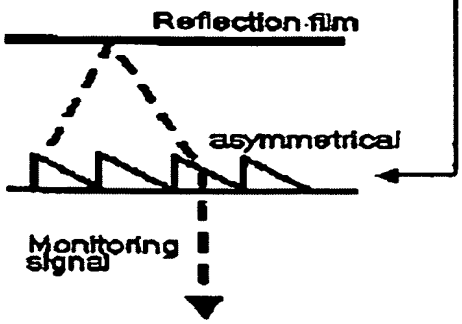

FIG. 3

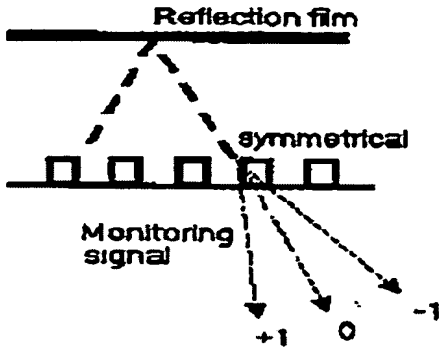

FIG. 4

The Office Action asserts that "Takeda discloses that a section of the diffracting device at a side of the optical device form a section of bilateral asymmetry (Fig. 3A, element 34)." Office Action, p. 3. In the "Response to Arguments" Section, the Office Action adds that "[t]he section of the diffracting device (Fig. 3A, element 34) is located on only one side of the optical device and diffraction grooves are shown at an angle. Therefore, the body of the integrated diffracting and optical device cannot be divided into equivalent right and left halves by only one plane and a section of bilateral asymmetry is formed." Office Action, pp. 18-19.

Applicants respectfully disagree because Takeda clearly shows that the body of the integrated diffracting and optical device is divided into equivalent right and left halves by only one plane. With reference to Fig. 3A, Takeda shows sectional lines 3B, which cut its hologram 3 in half for illustrative purposes, the result of which is shown in Fig. 3B. And, the half of the hologram seen in Fig. 3B would be identical to the other half of the hologram 3 on the other side of the sectional lines 3B. Thus, the two halves of the

hologram 3, when cut in half by line 3B as shown in Takeda, are symmetrical, and thus Takeda fails to teach or suggest the limitations of claim 9/3.

Claim 10 recites an optical pickup apparatus comprising a "diffracting means for transmitting the light beam emitted from the light emitting means, and for diffracting a light beam reflected from the optical recording medium; [and an] optical means having a reflecting portion and a transmitting portion, for reflecting one part of the light beam emitted from the light emitting means to the diffracting means by the reflecting portion and for transmitting another part of the light beam emitted from the light emitting means to the optical recording medium by the transmitting portion, and for transmitting the light beam reflected from the optical recording medium to the diffracting means by the transmitting portion." For similar reasons as discussed above with respect to claim 1, Takeda fails to teach or suggest these claim limitations, and claim 10 is allowable for at least these reasons.

Claim 24 recites that the "signal light detection signals and said monitor light detection signals are transmitted through a transmissive hologram." Takeda fails to teach or suggest this limitation. The Office Action asserts that the "signal light detection signals and said monitor light detection signals are transmitted through a transmissive hologram (Fig. 3C, elements 331 and 341)." Office Action, p. 5. Applicants disagree. Takeda obtains its monitor signal by reflection-diffracting light from a light source using a reflection hologram, rather than by a transmissive hologram. This is shown in Figure 3B of Takeda. As shown in figure 3C of Takeda, the hologram is formed on the surface of the reflection layer. (Annotated versions of Figures 3B and 3C of Takeda are reproduced above.) Thus, Takeda's monitor signals are not transmitted through a transmissive hologram, as recited in claim 24, but rather through a reflection hologram. For at least this reason, claim 24 is allowable over Takeda.

Claims 12, 14, 16 and 17 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Kay. This rejection is respectfully traversed for the following reasons.

Claim 12 recites "a diffracting device configured to transmit the light beam emitted from the light source, and to diffract a light beam reflected from the optical recording medium; [and] an optical device having a reflecting portion and a transmitting portion, configured to reflect one part of the light beam emitted from the light source to the diffracting device by the reflecting portion and to transmit another part of the light beam emitted from the light source to the optical recording medium by the transmitting portion, and to transmit the light beam reflected from the optical recording medium to the diffracting device by the transmitting portion."

Kay fails to teach or suggest these claim limitations. Instead, Kay teaches a grating beam splitter 42 disposed between a housing 32 and a transparent substrate 34, and a cap 65 having a reflector 64 disposed over the transparent substrate. Kay fails to teach or suggest the combination of a diffracting device and an optical device having a reflecting portion and transmitting portion, as recited in claim 12. For at least these reasons, claim 12 is allowable over Kay.

Claim 14 recites, inter alia, a "diffracting means for transmitting the light beam emitted from the light emitting means, and for diffracting a light beam reflected from the optical recording medium; [and an] optical means having a reflecting portion and a transmitting portion, for reflecting one part of the light beam emitted from the light emitting means to the diffracting means by the reflecting portion and for transmitting another part of the light beam emitted from the light emitting means to the optical recording medium by the transmitting portion, and for transmitting the light beam reflected from the optical recording medium to the diffracting device by the transmitting portion." And, claim 16 recites, inter alia, a method comprising "transmitting the light beam emitted from the light source and diffracting a light beam reflected from the optical recording medium by a diffracting device; [and] reflecting one part of the light beam emitted from the light source to the diffracting device by a reflecting portion of an optical device and transmitting another part of the light beam emitted from the light source to the optical recording medium by a transmitting portion of the optical device, and transmitting

the light beam reflected from the optical recording medium to said diffracting device by the transmitting portion of the optical device."

For the reasons discussed above in connection with claim 12, claims 14 and 16 are allowable over Kay. Claim 17 depends from claim 16 and should be allowed together with its base claim.

Claims 5, 7, 8, 11, 13, 15, 18 and 19 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Kay in view of Ohyama. Reconsideration is requested for the following reasons.

Claim 5 recites, inter alia, a "diffracting device configured to transmit the light beams emitted from the light sources and to diffract light beams reflected from the optical recording medium; [and] an optical device having a reflecting portion and a transmitting portion, configured to reflect one part of the light beams emitted from the light sources to the diffracting device by the reflecting portion and to transmit other parts of the light beams emitted from the light sources to the optical recording medium by the transmitting portion, and to transmit the light beams reflected from the optical recording medium to the diffracting device by the transmitting portion." As discussed above with respect to claim 12, Kay fails to teach or suggest these claim limitations. Ohyama is not relied upon by the Office Action to teach these limitations, and it does not teach these limitations. For at least these reasons, claim 5 is allowable over the proposed combination.

Claims 7 and 8 depend from claim 5 and contain every limitation of claim 5. Claims 7 and 8 should be allowed together with their base claim.

Independent claims 11, 13, 15 and 18 contain limitations similar to the limitations of claim 5 quoted above, and should be allowed for at least the same reasons as for allowance of claim 5. Claim 19 depends from claim 18 and should be allowed together with its base claim.

Moreover, the Applicants do not agree that the references are properly combinable as suggested in the Office Action. The Office Action admits that "Kay does not disclose light sources configured to emit light beams of different wavelengths or that each of the diffracting portions corresponds to one of the different wavelengths." Office Action, p. 9. For this shortcoming the Office Action relies on Ohyama, and asserts that it would have been obvious to combine the teachings of Kay and Ohyama "to increase the types of optical recording mediums with which the optical pickup apparatus is compatible." Office Action, p. 9.

The Applicants disagree that any motivation exists for the proposed combination. Whereas Ohyama relates to an optical device for reading a disc in a DVD system, Kay relates to generating focus and tracking error signals. There is no suggestion or motivation in Kay to employ in its device Ohyama's "light beams of different wavelengths and a diffracting device that includes plural diffracting portions, in which each of the diffracting portions corresponds to one of the different wavelengths." Absent the Applicants' disclosure, there is no suggestion or motivation for such a combination. This is another reason why claims 5, 7, 8, 11, 13, 15, 18 and 19 are allowable.

Applicants acknowledge with appreciation the indication that claim 9/7 would be allowable if rewritten in independent form. To this end, Applicants have added new claim 25 which includes the limitations of claim 9/7, base claim 5 and intervening claim 7. New claim 25 is considered to be in condition for allowance. Claim 9 has been amended accordingly to depend only from claim 3.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

Dated: August 6, 2004

Respectfully submitted,

By_____

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